



Postdoctoral Researchers in Offshore Wind Powered Carbon Capture & E-Fuels Production

Pathways to a survivable future climate make it clear that carbon capture from the atmosphere (DAC) and/or ocean (DAC) will become necessary by mid-century. In advance of that time, research and demonstration projects are required to prove out viable technical solutions to reliably capturing and durably storing carbon, on a scale that can be deployed globally. The roll-out of carbon capture may also include carbon capture and utilization (CCUS), making use of captured carbon for synthetic fuels (methanol), and co-production of non-carbon based E-fuels like H_2 and NH_3 more generally. At the same time, there is tremendous 'stranded' far-offshore wind energy too remote from grid-connection for use, but potentially harvestable to these systems, either convention fixed position (bottom-mounted or moored) or on-board 'energy ships' or mobile wind turbine platforms with station keeping thrusters using wind energy for on-board electricity generation.

2 or more Post-Doctoral positions are available in a research project led by Dr. Curran Crawford, who directs the Sustainable Systems Design Lab, part of the Institute for Integrated Energy Systems (IESVic) at the University of Victoria, to complement ongoing work that is part of the [Solid Carbon](#) ongoing research project and other NSERC and PICS funding for green shipping and e-fuels. The salary range for the positions is \$60-\$80k/yr + benefits, depending on skills and experience. Specific research topics for the post-doc positions include the following:

1. Platform-level integration of DAC/DOC processes with offshore renewable energy (wind, wave, solar, tidal, etc.) including systems optimization, integration of energy and other storage mechanisms, advanced controls and digital twins, etc.
2. Mobile wind energy platforms, utilizing conventional wind turbines on un-moored platforms to capture energy for DAC/DOC/e-fuels production across the oceans. This work can span from detailed device-level simulations of stability and performance, through to fleet and routing analysis for voyage planning including capture and off-take/sequestration and LCA/TEA analysis.
3. Simulation/optimization of direct ocean capture (DOC) technologies, focused on electrochemical and pre/post-treatment of seawater input/output flows for carbon capture with tools including COMSOL and ASPEN/HYSIS.
4. Delivery of CO_2 to subsea sequestration sites (subsurface basalt) using novel configurations from FPSO style platforms, to un-manned submersible vessels; conceptual design, TEA work and feasibility analysis for scale-up to Gt scale.
5. An assessment of the potential for marine fuels production using 'stranded' offshore wind to supply e-fuels for Green Shipping Corridors globally. Also contributing to a BC-specific study of various e-fuels production options for marine vessels operating from ports in BC.

Key responsibilities

- Conduct independent and collaborative research in the above topic areas
- Publish findings in peer-reviewed, high-quality journals and at conferences
- Contribution to IP development and commercialization
- Collaborate with academic and industry partners
- Mentor graduate students
- Contribute to grant writing for funding acquisition
- Support lab administration

Requirements

- PhD degree in a relevant area of engineering (mechanical, marine/ocean, etc.)



- Experience in a specific element relevant to the above workplan topics
- Familiarity with and enthusiasm for low/negative-carbon energy systems analysis
- Ideally knowledge of Python for modeling and academic workflow tools including LaTeX, Zotero, Slack, etc.
- Strong writing, conversational and presentation abilities in English
- Ability to work effectively in a diverse team

Dr. Crawford strongly encourages applications from underrepresented groups, including women, Indigenous peoples, persons with disabilities, members of visible minorities, persons of any sexual orientation or gender identity, and those persons experiencing barriers to equity. The SSDL, IESVic and larger [UVic communities](#) are diverse and committed to upholding the values of equity, diversity, and inclusion in our living, learning and work environments.

Timeline

Positions starting ASAP; applications accepted on a rolling basis.

How to apply

Interested candidates should email Dr. Crawford at curranc@uvic.ca with the subject line **Postdoc in Offshore Wind + Carbon** and attach:

- ☒ A detailed curriculum vitae (resume)
- ☒ A one-page cover letter describing your relevant (research) experience and motivation for the position, for the particular identified area of need from above list
- ☒ Names and contact details for two references
- ☒ (Optional) Sample publications/thesis, etc.

UVic is committed to upholding the values of equity, diversity, and inclusion in our living, learning and work environments. In pursuit of our values, we seek members who will work respectfully and constructively with differences and across levels of power. We actively encourage applications from members of groups experiencing barriers to equity. Read our full equity statement [here](#).

